IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

Listing of Claims

1. (currently amended)A system comprising:

a first device;

a second device;

a plurality of paths connected between the first device and the second device; and

a third device which is connected to the first device,

wherein the first device transfers data to the second device using the plurality of paths at a predetermined ratio defining a weighting of an amount of communications to be allocated among the plurality of paths so that communication loads among the plurality of paths are balanced,

wherein the third device detects congestion of the plurality of paths and notifies the first device of the congestion,

wherein the first device changes the predetermined ratio among the paths, thereby changing the weighting of an amount of communications to be allocated among the plurality of paths, based on notification from said third device of the congestion on the plurality of paths,

wherein the first device ~~to transfer~~transfers ~~the~~data to the second device using the plurality of paths~~, and~~ according to the changed predetermined ratio,

wherein said first device and the second device are storage devices~~.~~,

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wherein the third device has information on the predetermined ratio and a change rate to be applied to the predetermined ratio to compute the changed predetermined ratio, when a change in the predetermined ratio is required,

wherein the third device, when congestion of the plurality of paths has been detected, computes the changed predetermined ratio among paths based on the change rate, and sends information on the changed predetermined ratio to the first device, and

wherein the first device transfers data to the second device using the plurality of paths based on the changed predetermined ratio among paths.

Claim 2 (canceled).

3. (currently amended)A system comprising:

a first device;

a second device;

a plurality of paths connected between the first device and the second device, the plurality of paths being external of each of the first and second devices; and

a third device which is connected to the first device,

wherein the first device transfers data to the second device using the plurality of paths at a predetermined ratio defining a weighting of an amount of communications to be allocated among the plurality of paths so that communication loads among the plurality of paths are balanced,

wherein the third device detects congestion of the plurality of paths and notifies the first device of the congestion,

wherein the first device changes the predetermined ratio among the paths, thereby changing the weighting of an amount of communications to be allocated among the plurality of paths, based on notification from said third device of the congestion on the plurality of paths,

wherein the first device transfers data to the second device using the plurality of paths according to the changed predetermined ratio, and

wherein the first device is a computer, and the second device is a storage device,

wherein the third device has information on the predetermined ratio and a change rate to be applied to the predetermined ratio to compute the changed predetermined ratio when a change in the predetermined ratio is required,

wherein the third device, when congestion of the plurality of paths has been detected, computes the changed predetermined ratio among paths based on the change rate, and sends information on the changed predetermined ratio to the first device, and

wherein the first device transfers data to the second device using the plurality of paths based on the changed predetermined ratio among paths.

4.   (original)   A system according to claim 3, wherein each of the plurality of paths has a network device for connecting the first device and the second device,

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wherein the third device is connected to the network device via a network, and

wherein the third device receives a notification of occurrence of congestion in the network device from the network device via the network.

5.   (original)   A system according to claim 4, wherein the notification is a notification based upon SNMP Trap.

6.   (previously presented)   A system according to claim 1, wherein each of the plurality of paths has a network device for connecting the first device and the second device,

wherein the third device is connected to the network device via a network, and

wherein third device receives information on a discarded packet in the network device from the network device via the network and judges congestion of the plurality of paths based on the information on the discarded packet.

7.   (original)   A system according to claim 6, wherein, in the case in which the number of discarded packets received from the network device is larger than the number of discarded packets received previously, the third device judges that congestion has occurred in the plurality of paths having the network device.

Claim 8 (canceled).

9. (currently amended)A system according to claim 8̶1̲, wherein when the third device detects recovery from congestion of the plurality of paths, computes the changed predetermined ratio among the paths based on the change rate, and sends information on the changed predetermined ratio among paths to the first device, and

wherein the first device transfers data to the second device using a plurality of paths based on the received changed predetermined ratio among paths.

10. (currently amended)A system comprising:

a first device;

a second device; and

a plurality of paths connected between the first device and the second device,

wherein the first device transfers data to the second device using the plurality of paths at a predetermined ratio defining a weighting of an amount of communications to be allocated among the plurality of paths so that communication loads among the plurality of paths are balanced,

wherein the first device detects congestion of the plurality of paths,

wherein the first device changes the predetermined ratio among the paths, thereby changing the weighting of an amount of communications to be allocated among the plurality of paths, according to the detection of the congestion of the plurality of paths by the first device,

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wherein the first device ~~to transfer~~ transfers ~~the~~ data to the second device using the plurality of paths~~, and~~ according to the changed predetermined ratio,

wherein the first device and the second device are storage devices,

wherein the first device has information on the predetermined ratio and a change rate to be applied to the predetermined ratio to compute the changed predetermined ratio when a change in the predetermined ratio is required,

wherein the third device, when congestion of the plurality of paths has been detected, and computes the changed predetermined ratio among paths based on the change rate, and

wherein the first device transfers data to the second device using the plurality of paths based on the changed predetermined ratio among paths.

Claim 11 (canceled).

12. (currently amended)A system comprising:

a first device;

a second device; and

a plurality of paths connected between the first device and the second device, the plurality of paths being external of each of the first and second devices,

wherein the first device transfers data to the second device using the plurality of paths at a predetermined ratio defining a weighting of an amount of

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communications to be allocated among the plurality of paths so that communication loads among the plurality of paths are balanced,

wherein the first device detects congestion of the plurality of paths,

wherein the first device changes the predetermined ratio among the paths, thereby changing the weighting of an amount of communications to be allocated among the plurality of paths, according to the detection of the congestion of the plurality of paths by the first device,

wherein the first device to transfers the data to the second device using the plurality of paths according to the changed predetermined ratio,

wherein the first device is a computer, and the second device is a storage device,

wherein the first device has information on the predetermined ratio and a change rate to be applied to the predetermined ratio to compute the changed predetermined ratio when a change in the predetermined ratio is required,

wherein the third device, when congestion of the plurality of paths has been detected, computes the changed predetermined ratio among paths based on the change rate, and

wherein the first device transfers data to the second device using the plurality of paths based on the changed predetermined ratio among paths.

13. (previously presented) A system according to claim 10, wherein each of the plurality of paths has a network device for connecting the first device and the second device, and

wherein the first device receives a notification of occurrence of congestion in the network device from the network device via the plurality of paths.

14. (original) A system according to claim 13, wherein the notification is a flag based upon ECN.

15. (original) A system according to claim 12, wherein, in the case in which a response is not returned from the second device for a predetermined period, the first device judges that congestion has occurred in the plurality of paths.

16. (original) A system according to claim 12, wherein, in the case in which an acknowledgement of the data sent to the second device has been received redundantly, the first device judges that congestion has occurred in the plurality of paths.

Claim 17 (canceled).

18. (currently amended) A system according to claim ~~17~~10, wherein, when a data size, which can be sent to the plurality of paths in which the congestion has occurred, has exceeded a value set in advance after the congestion occurrence, the first device judges that the plurality of paths has recovered from the congestion.

19.   (currently amended)A storage system comprising:

a control unit;

a disk device which is connected to the control unit; and

an interface which is connected to a network which is connected

between said interface of said storage system and another storage system,

wherein the interface is connected to said another storage system by

a plurality of paths in the network,

wherein the control unit sends data stored in the disk device as a

packet to said another storage system using the plurality of paths at a

predetermined ratio defining a weighting of an amount of communications to

be allocated among the plurality of paths so that communication loads among

the plurality of paths are balanced,

wherein, in the case in which an acknowledgement for the packet sent

to said another storage system has not been received for a fixed period, the

control unit judges that congestion has occurred in the plurality of paths, and

wherein the control unit changes the predetermined ratio among

paths, thereby changing the weighting of an amount of communications to be

allocated among the plurality of paths, according to the occurrence of the

congestion and performs packet transfer of data to said another storage

system according to at the changed predetermined ratio among paths.,

        wherein the control unit has information on the predetermined ratio

and a change rate to be applied to the predetermined ratio to compute the

changed predetermined ratio when a change in the predetermined ratio is

required,

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wherein the control unit, when congestion of the plurality of paths has been detected, computes the changed predetermined ratio among paths based on the change rate, and

wherein the control unit transfers data to said another storage system using the plurality of paths based on the changed predetermined ratio among paths.

20.   (currently amended)A system comprising:

a first storage device;

a second storage device;

a plurality of paths connected between the first storage device and the second storage device; and

a computer which is connected to the first storage device,

wherein a switch is included in the plurality of paths,

wherein the first storage device transfers data to the second storage device using the plurality of paths at a predetermined ratio defining a weighting of an amount of communications to be allocated among the plurality of paths so that communication loads among the plurality of paths are balanced,

wherein the computer detects congestion of a first path among the plurality of paths based on a notification from the switch and notifies the first storage device of the-a changed predetermined ratio to be used after changedetection of the congestion,

wherein the first storage device changes the predetermined ratio among paths to the changed predetermined ratio-after change, thereby

changing the weighting of an amount of communications to be allocated among the plurality of paths, based on the changed predetermined ratio from the computer and transfers data to the second storage device using the plurality of paths according to the changed predetermined ratio,

wherein the computer has information on the predetermined ratio and a change rate to be applied to the predetermined ratio to compute the changed predetermined ratio when a change in the predetermined ratio is required,

wherein the computer, when congestion of the plurality of paths has been detected, computes the changed predetermined ratio among paths based on the change rate, and sends information on the changed predetermined ratio to the first storage device,

wherein the first storage device transfers data to the second storage device using the plurality of paths based on the changed predetermined ratio among paths,

wherein the computer judges recovery from the congestion of the first path and notifies the first storage device of the a further changed predetermined ratio, and

wherein the first storage device changes the changed predetermined ratio among paths to the further changed predetermined ratio and transfers data to the second storage device using the plurality of paths according to the further changed predetermined ratio.

21.   (new) A storage system comprising:

a control unit;

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a disk device which is connected to the control unit; and

an interface which is connected to a network which is connected between said interface of said storage system and of a plurality of other devices,

wherein said network is external of each of said storage system and the other devices,

wherein the interface is connected to the other devices by a plurality of paths in the network,

wherein the control unit sends data stored in the disk device as a packet to the other devices using the plurality of paths at a predetermined ratio defining a weighting of an amount of communications to be allocated among the plurality of paths so that communication loads among the plurality of paths are balanced,

wherein, in the case in which an acknowledgement for the packet sent to the other devices has not been received for a fixed period, the control unit judges that congestion has occurred in the plurality of paths,

wherein the control unit changes the predetermined ratio among paths, thereby changing the weighting of an amount of communications to be allocated among the plurality of paths, according to the occurrence of the congestion and performs packet transfer of data to the other devices at the changed predetermined ratio among paths,

wherein the control unit has information on the predetermined ratio and a change rate to be applied to the predetermined ratio to compute the changed predetermined ratio when a change in the predetermined ratio is required,

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wherein the control unit, when congestion of the plurality of paths has been detected, computes the changed predetermined ratio among paths based on the change rate, and

wherein the control unit transfers data to the other devices using the plurality of paths based on the changed predetermined ratio among paths.

22.   (new) A system according to claim 1, wherein said third device when computing the changed predetermined ratio, performs processing for reducing a ratio among paths, which is assigned to a path in which congestion has occurred, at a designated change rate and allocates the reduced amounts to the other paths.

23.   (new) A system according to claim 22, wherein said third device when computing the changed predetermined ratio includes:

means for, in a case in which a same number of congestion has occurred in all paths being used, and in a case in which all paths are recovered from the congestion, performing a process for returning the changed predetermined ratio among the paths to a default value.

24.   (new) A system according to claim 1, wherein said third device when computing the changed predetermined ratio includes:

means for, upon detecting that a congestion has occurred on a path, calculating a ratio being used on the path at the time of congestion and a difference between the ratio at the time of congestion and a ratio set in

advance for the path upon which the congestion has occurred and allocating the difference to ratios of the other paths.